

Specifications for Speed Advisory Trailer with 25" display, directional Ka-band radar, and on-board computer control system

Trailer

1. The trailer shall be registered with the National Highway Traffic Safety Administration (NHTSA) and bears federal identification numbers. (Trailers without this registration are not be acceptable, since federal regulations require that all trailer designs be approved by NHTSA.)
2. The trailer shall be constructed using a dual frame design, made of 11 gauge, 2" square tubular steel with continuous welds and approximately 48" X 75".
3. The trailer shall be protected with a durable graffiti-proof powder coat, orange paint over zinc primer.
4. For additional protection from vandalism, all wiring shall be contained inside the frame for protection.
5. The trailer shall fold down to under 40 inches in height for easy towing (no blind spot) and set up to a height over 8 feet so that the display can be viewed above vehicles in front of the trailer.
6. The trailer shall have a see-through design, for the protection and visibility of pedestrians behind the trailer.
7. The trailer shall have four adjustable jacks on the corners to accommodate full leveling of the trailer on a slanted roadside and to offer superior stability during high wind conditions. All jacks shall fold up for transporting.
8. Trailer weight shall be approximately 1000 lbs. Tongue weight shall not exceed 100 lbs.
9. The tongue of the trailer shall be removable at the frame of the trailer. The taillight wiring harness shall also disconnect from the trailer so that the tongue may be stored inside the trailer's utility box.
10. The trailer shall have DOT approved taillights with a license plate mount. Reflective tape shall be present on all four sides of the trailer for visibility at night.
11. The trailer shall be provided with a 2,000 lb. capacity leaf springs. Torsion springs are not acceptable because they subject the internal components of the trailer to too

much shock during transit.

12. The trailer shall have 14" wheels with 185R/14 radial tires and two locking lug nuts per wheel.
13. The utility box shall be at least 36"x 43"x 12" in size. The box shall be weatherproof, have a weatherproof lock, and be able to store at least (6) batteries, a charger, speed limit sign with interchangeable numbers, an alarm, and a traffic computer. Utility box shall be able to store up to 6 batteries if internal storage for other components is reduced.
14. The display box shall provide weather-tight enclosure for the radar, display and optional traffic computer with the radar interface. It shall have a shatterproof MR-10 LEXAN window for viewing the 25 inch Super Bright LED display. It shall also have key locked handles for security.

Speed Display

15. The speed display shall be a 2-character, seven-segment, amber LED-type display. The digits shall be 25 inches tall.
16. The speed display shall be constructed with more than 810 LEDs so that it is visible in direct sunlight at a distance of over 1,350 ft. The display shall be of the seven-segment type.
17. For adequate battery life, the speed display shall consume less than 2 amps.
18. The display shall dim automatically at night to prevent blooming.
19. The speed display shall externally display the status of the battery charge.
20. The display shall be able to be easily removed from the trailer for service.

Radar

21. The radar shall be operate in the Ka-band.
22. The radar shall be mounted inside the display box for protection from vandalism.
23. The radar shall employ the latest digital signal processing (DSP) technology.
24. The radar shall be a complete direction-sensing radar. It shall detect approaching traffic only, and look past closer traffic moving in the opposite direction, ensuring that approaching drivers do not see the irrelevant speeds of closer, opposite-lane

vehicles.

25. The radar shall be capable of properly displaying the speed of an approaching vehicle while the trailer is in a stationary position or while the trailer is being towed at speeds of 15 to 60 mph. A GPS option shall be available to make moving mode operation most reliable.
26. The radar shall have a 13 degree beamwidth for proper stationary and moving operation.
27. The radar shall be easily removed for calibration and service.

Additional Standard Equipment

28. The trailer's battery shall be a Group 31 deep-cycle battery, rated for at least 125 amp hours. One fully charged battery shall provide at least 2 days of continuous use. Each battery shall be contained in its own box to prevent damage or accidental discharge across the terminals. The trailer shall be capable of accepting at least six batteries.
29. The trailer shall have an internal 110 Volt AC charger. The charger shall automatically shut down when the batteries are fully charged and indicate with LEDs the charge on the batteries. The charger shall be able to charge 4 batteries overnight.
30. A cigarette plug protected with a 5 amp circuit breaker shall be provided on the side of the utility box. A 1.5" diameter exit hole on the side of the utility box shall be provided for the traffic monitoring pneumatic hoses. Both holes shall be covered with weatherproof lids.
31. The main power switch to the display and approach only radar shall be mounted inside the utility box and protected with a 5 amp circuit breaker.
32. The trailer shall be supplied with a speed limit sign with interchangeable numbers from 15 to 75. The speed limit sign shall mount to a bracket on top of the display box, so that it is deployed at a height of over 10 feet so as to be seen over obstacles.

Internal Microcomputer

33. The speed display shall be controlled by an internal microcomputer. This microcomputer shall have an internal battery to remember system settings when the trailer is turned off.
34. The microcomputer shall keep track of time, date, and day of the week. This information shall be retained if the power is lost. The unit shall be Y2K compatible.

35. The microcomputer shall be used to enable a flashing overspeed alert, with a programmable speed setting. When a vehicle approaches the trailer faster than the overspeed setting, the displayed speed shall flash.
36. The microcomputer shall be used to enable a flashing strobe alert, with a programmable speed setting, if the trailer is equipped with the optional strobe lights. When a vehicle approaches the trailer faster than the programmed setting, the strobe lights shall flash.
37. The microcomputer shall be used to enable a siren alert, with a programmable speed setting, if the trailer is equipped with the optional siren. When a vehicle approaches the trailer faster than the programmed setting, the siren shall sound.
38. The microcomputer shall be used to be equipped with two additional speed alarms, with independently programmable speed settings. These shall be available for activating other 12 Volt equipment. When a vehicle approaches the trailer faster than the programmed setting, the relevant relay shall activate.
39. The microcomputer shall allow the operator to set the minimum speed that the speed display will display.
40. The microcomputer shall allow the operator to set the maximum speed that the speed display will display.
41. The microcomputer shall be allow the operator to set the sensitivity (range) of the radar.
42. The speed display shall be equipped with two operational timers, adjusted through the microcomputer. Each timer shall be capable of turning the speed display and radar on and off at independently programmable times. The timers shall be able to be configured as seven-day or five-day (Monday through Friday) timers.
43. The microcomputer shall allow the operator to set the update rate of the speed display.
44. The microcomputer shall be allow the operator to perform diagnostics on the system. It shall allow the radar to be tested with a tuning fork, it shall allow a user-programmed speed to be displayed on the speed display, and it shall allow each relay to be activated independently
45. The microcomputer shall be report the battery voltage to the operator. It also shall allow the operator to view the system settings.
46. Software upgrades to the microcomputer shall be field-programmable.

Optional Equipment

The trailer shall be able to accept the following optional equipment. The trailer shall be also able to be retrofitted with any of the optional equipment after the time of purchase.

1. Two strobe lights, one on each side of the speed display, for slowing down very hazardous drivers. Strobe controller has bright/dim switch.
2. A 120 dB siren, for alerting the work zone crew of vehicles approaching at dangerous speeds.
3. An internal GPS unit, for assisting the trailer in moving mode operation.
4. Tow vehicle charger, for charging the trailer's batteries or powering the trailer while the unit is being towed.
5. Motion sensing alarm which activates when the trailer is moved or when the utility box door is opened. It shall be provided with 2 wireless remotes to activate and deactivate the alarm. It shall have audio confirmation when the alarm status is changed.
6. Solar charger which provides at least 17 watts charge to the batteries during sunny days. A charge controller shall be provided with the solar panel to provide regulation and prevent over-charging the batteries. The charge controller shall have an automatic low voltage disconnect that prevents fully discharging the batteries. An alternate solar charger shall be available with a 55 watt output.
7. Spare tire and wheel that mounts and locks to the trailer
8. Bar or cable lock that prevents the wheels from moving while it is deployed in a stationary position.
9. Extra batteries for more hours of use in the field.
10. A Traffic Monitor Computer with a radar interface (Speed information) and pneumatic hose inputs (Speed, Volume, Gap, Class information). It shall be able to be used inside or outside the trailer for before, during and after trailer deployment studies. The Traffic Monitoring Computer shall contain the following features:
 - A Radar interface for time stamped speed storage without the need for pneumatic hoses.
 - Two pneumatic hose inputs.

- An internal battery for remote deployment of up to 30 days and the battery's charger
- 2 Megabytes of internal memory.
- Communication cables for connection to an IBM-compatible computer (not provided) as an alternate method of downloading the data for further data analysis, storage and printing.
- Analysis software that is Windows-based and "Year 2000" compliant.
- Weatherproof and vandal-resistant steel enclosure with lock hasp.
- An optional pneumatic hose kit shall be available.